EFFECTS OF LONG-TERM AMBIENT HYDROGEN SULFIDE EXPOSURE ON ASTHMA AND LUNG FUNCTION

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Background and Aims: The health effects of long-term, low-level H_2S exposures are unknown. This study took place in Rotorua, New Zealand, the world's largest city built on a geothermal field (population >55,000). Geothermal gas, including H_2S, emission sources are distributed throughout the city.
Methods: Participants were adult Rotorua residents, each of whom performed spirometry. H_2S exposure was estimated from networks of passive samplers distributed throughout the city in the summer and winter. The monitoring results were used to generate concentration surfaces across the city, from which H_2S concentrations at participants' current residential addresses were estimated.
Results: A total of 739 participants was used in this analysis, of whom 169 (23%) reported a doctor's diagnosis of asthma. H_2S exposure was divided into quartiles based on estimated residential concentrations averaged over winter and summer. The asthma diagnosis rate was lower in the highest exposure group (16.6%) than in the other three groups combined (24.8%) (p=0.07). Logistic regression analysis for asthma, adjusted for smoking, age, BMI and ethnicity showed the 3 highest H_2S exposure quartiles to have odds ratios of 1.21 (95% CI:0.75-1.95), 0.94 (0.58-1.53), and 0.70 (0.41-1.88), in order of increasing residential H_2S exposure. Participants with asthma had higher adjusted FEV_1 measures associated with higher residential H_2S exposures on a continuous scale (p=0.02), whereas there was no association with H_2S for those without an asthma diagnosis (p=0.79).
Conclusions: This study presents evidence of reduced asthma risk and higher FEV_1 in asthmatics living in higher H_2S exposure areas. This might be a direct effect on the airways of asthmatic subjects, as recent animal studies have shown inhaled H_2S can reduce inflammation (Faller et al 2010), or it could be a healthy survivor bias.
References:

Faller S, Ryter SW, Choi AMK, et al. Inhaled Hydrogen Sulfide Protects Against Ventilator-induced Lung Injury. Anesthesiology 2010;113:104-15.